

MIGRATORY BEHAVIOR OF THE SNOOT BUTTERFLY, *LIBYTHEANA BACHMANII* LARVATA (STRECKER)¹

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The snout butterfly, *Libytheana bachmanii larvata* (Strecker), is generally distributed in the southwestern United States and possibly in northern Mexico. Aperiodically the snout butterfly undertakes mass migrations in the fall northward through Central Texas. The most recent of these migrations occurred during August-September 1971. The last previous recorded mass migration by these insects through this region took place during August-September 1947 (Breland, 1948). Other large migrations have been reported during the late summers of 1941 (Rau, 1941), and 1921 and 1911 (Williams, 1958).

The majority of the observations of the density and duration of the 1971 migration and the migratory behavior were made within a 40-mile radius of Austin, Texas. In addition, observations of the extent of the migration were made along a line from Texarkana to San Antonio. An 80-mile east-west traverse was made immediately north of San Antonio along with a 110-mile traverse immediately south of Austin, a 160 mile traverse 30 miles north of Austin, and a traverse across southern Arkansas. These personal data were supplemented by questioning of travelers from South Texas.

The migration was divided into three apparent phases:

1.) During the period 22-25 August, the first snout butterflies were observed in the Austin area. Directional sense and flight were very

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strong. The mean flight heading of the migrating butterflies was 10-20 degrees east of true north. Almost all of the butterflies were flying individually during this period. The average count of individuals in the area of San Marcos-Bastrop-Taylor-Burnet-Austin during this four-day period was 760,000 butterflies per hour per mile of the migratory front.

2.) The main body of migrating butterflies passed through the Austin area during the 26-28 August period. Directional sense and flight remained very strong. Several individuals, injured by passing automobiles and no longer capable of flight, were observed persistently walking in a northeast direction beneath the main flight stream of the migration. During this period flight was conducted in large groups. Counts of individuals during this period ranged from 2.7-6.8 million, with an average of 3.8 million butterflies per hour per mile of the migratory front.

3.) The last period, 29 August-2 September, was characterized by pairing of individuals, loss of strong flight and directional senses, and the general diminution of numbers in the Austin area. A notable lack of the snout butterfly was evidenced north of an east-west line through Palestine.

Throughout the migration and apparent beginnings of courtship activity (third phase), snout butterfly movements were notable in that they were almost exclusively confined to the hours of 10 a.m.-6 p.m. The heaviest activity was observed between 11 a.m.-4 p.m. Although nighttime observations were attempted and nets were laid along previously observed areas of high-density daytime routes, no evidence of any nocturnal flight activity was gathered. Usually with the approach of late afternoon and early evening, large clusters of butterflies would settle in pin oaks, live oaks, pecan trees, and blossoming crepe myrtles. Breland (1948) has observed previous clustering of snout butterflies in live oaks during migration. Breland further states that the attraction to pin oaks by snout butterflies is stimulated by the desire to feed upon exudants from insect galls infesting the trees.

Morning hours prior to 10 a.m. were spent by the butterflies unfolding their wings and positioning themselves perpendicular to the sun in an apparent desire to raise their body temperatures prior to flight. Migratory flight activity appeared to be stimulated when the air temperature reached 82-84 degrees F. Cessation of the migratory

flights in the evening was probably not connected with specific air temperatures (86-94 degrees F. at 6 p.m.), but rather was probably associated with evening feeding activity on insect galls and flowering trees.

During the entire migratory activity, no unusual concentrations of predators or diet shift to the butterflies by area birds were noted. Only two instances of butterfly capture effected by birds were observed during the entire 12-day observation period. In one instance a juvenile mockingbird captured and presumably ate a snout butterfly (24 August). In the second instance, a juvenile blue jay captured a snout butterfly and was observed to spit it out shortly thereafter (23 August). It is notable that in both instances, capture was effected by juvenile birds during the early part of the butterfly migratory period. The known rejection of captured prey in one instance and the general lack of interest by other area predators during the migration indicate that the snout butterfly possesses an effective chemical defense.

Throughout the observational period few butterflies were observed with frayed wings, probably indicating that general mating had not yet taken place. The pairing and loss of a strong directional vector in flight during the period 29 August-2 September is characteristic of courtship activity. No actual mating was observed. The lack of notable numbers of snout butterflies in North or East Texas before, during, or after the observation of high numbers of butterflies in Central Texas, coupled with the apparent courtship activity in Central Texas, and the loss of strong migratory instinct in early September indicate that Central Texas probably supported a primary breeding ground for this species. This conclusion is complemented by the heavy concentrations of the snout butterfly observed in South Texas 10-14 days prior to their appearance in Central Texas. These insects had been observed primarily in the agricultural regions of South Texas flying in a general northeasterly direction. It is probable that the two masses of butterflies, the earlier one in South Texas and the later one in Central Texas, were, in actuality, the same group.

The east-west extent of the migratory front was not fully determined. During all three traverses in Central Texas no definite diminution of numbers of migratory butterflies was noted. Thus it can be reasonably assumed that the width of the migratory front was at least 160 miles centered on Austin.

A second and probable associated area of migratory activity in southeast Texas and southern Louisiana was noted during the period 29 August—1 September by Dr. Ross Arnett. Dr. Arnett reports that he observed dense concentrations of migrating snout butterflies between Houston and New Orleans while travelling from San Antonio to Tallahassee, Florida. Dr. Arnett's observations during his traverse of the southern portion of the United States also indicate that the snout butterfly is primarily confined to the southwestern U.S.

LITERATURE CITED

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ABSTRACT.—Observations on route and behavior of the snout butterfly, *Libytheana bachmanii larvata* (Strecker), during a mass migration through Central Texas in August-September 1971, indicate that Central Texas is a major breeding ground of this species. Behavioral observations demonstrate that the snout butterfly primarily migrates during the daytime hours after the air temperature reaches 82-84 degrees F. In addition, observations of predator-prey relationships indicate that the snout butterfly possesses a chemical defense effective against birds.—Michael R. Helfert, Department of Geography, University of Texas/Austin, Austin, TX 78712.

Descriptors: Lepidoptera; Libytheidae; snout butterfly; migratory behavior; migratory route; *Libytheana bachmanii larvata*, in Texas and Louisiana.